WE CLAIM:

~~Claims~~

SUB A9

1. Method for the gasifying of organic substances and substance mixtures in which

a) the organic substances are fed into a pyrolysis reactor in which the organic substances are kept in contact with a heat carrier medium whereby a rapid pyrolysis takes place in which the organic substances are reacted into pyrolysis products whereby the pyrolysis products consist of pyrolysis gases with condensable substances and a solid residue containing carbon,

b) the solid residue containing carbon and the heat carrier medium are fed to a firing in which the residue containing carbon is fired and the heat carrier medium heated and fed again to the pyrolysis reaction (heat carrier medium cycle)

c) the pyrolysis gases containing tar are reheated in a second reaction zone so that a gas product is obtained with at high caloric value,

characterized in that

d) the pyrolysis is carried out in a moving bed reactor or a rotary drum,

e) if necessary, a reactant such as steam is mixed in with the pyrolysis gases and then

f) are fed into an indirect heat exchanger in which the pyrolysis gases react with the reactant,

g) the firing waste gases are fed through the indirect heat exchanger such that their heat content is utilized for the reaction of the pyrolysis gases with the reactant, and

h) the ash of the solid residue containing carbon and the heat carrier medium is removed from the firing and recycled into the pyrolysis reactor at the input end for the organic material.

2. Method according to Claim 1, characterized in that the pyrolysis is carried out at a temperature of 550-650°C.

3. Method according to Claims 1 and 2, characterized in that the reaction of the pyrolysis gases with steam is carried out at a temperature of 900-1000°C.

4. Method according to one of Claims 1-3, characterized in that the reaction of the pyrolysis gases with steam is carried out in the presence of a catalyst.

5. Method according to Claim 4, characterized in that dolomite, calcite, nickel, nickel oxide, nickel aluminate, or nickel spinel is used as catalyst.

6. Method according to Claim 5, characterized in that the catalysts are used simultaneously as heat carrier medium for the heat carrier medium cycle.

7. Method according to one of Claims 1-6, characterized in that the hot pyrolysis gases are dedusted before the addition of steam.

8. Method according to one of Claims 1-7, characterized in that the catalyst is fed to the hot pyrolysis gases in an entrained flow mode and is separated out after the reaction with steam, and returned to the hot pyrolysis gases in the cycle.

9. Method according to one or more of Claims 1-8, characterized in that the pyrolysis gases are dedusted and quenched after the reaction with steam..

10. Method according to one of Claims 1-9, characterized in that a portion of the pyrolysis gas is fired and the heat is utilized for the pyrolysis and/or the reaction with steam.

11. Method according to one of Claims 1-10, characterized in that the solid residue containing carbon and the heat carrier medium are fed to a grate firing.

12. Apparatus for carrying out the method according to Claims 1-11 with a pyrolysis reactor, a firing for the pyrolysis residue, a reaction zone for the pyrolysis gases, a heat carrier cycle between the pyrolysis reaction and the firing, characterized in that a shaft kiln (403) or a rotary drum is equipped with a sluice (402) for a material used (401) and a sluice (410) for a heat carrier medium (414) in addition to a firing (407) with a grate (405), and the shaft kiln (403) has a feed (404) for the firing (407), and the waste gases (424) of the firing (407) can be fed to a heat exchanger (417) that is connected with the shaft kiln (403) via a line (403a) for the pyrolysis gases, and the firing (407) is connected via a discharge apparatus, such as a worm (408) to a conveyor (409) for the heat carrier medium (414).

13. Apparatus according to Claim 12, characterized in that the heat carrier medium consists of fire-resistant materials such as sand, gravel, split, aluminum silicate, corundum, graywacke, quartzite, or cordierite.

14. Apparatus according to Claim 12, characterized in that the heat carrier medium consists of molded bodies composed of metallic or nonmetallic substances such as steel or ceramic balls.

15. Apparatus according to Claims 13 and 14, characterized in that the heat carrier medium has a grain size of 1-40 mm.

16. Apparatus according to one or more of Claims 12-15, characterized in that the firing (407) is performed as a grate firing.

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17. Apparatus according to one or more of Claims 12-16, characterized in that the heat exchanger (417) has a catalyst filling.

18. Apparatus according to one or more of Claims 10-17, characterized in that the pipes of the heat exchanger (417) consist of catalytically active material.

19. Apparatus according to one or more of Claims 12-18, characterized in that the heat exchanger (417) is assigned to a solid bed reactor with catalyst feed.

20. Apparatus according to one or more of Claims 12-19, characterized in that the heat exchanger (417) is first connected to a filter for dedusting.

ADD A12 >

ADD B4 >